Research Title : A Study of Air Quality Affecting the Growth of Orchid Plants in the Area of Wichienmatu School , Mueang Trang District, Trang Province

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Abstract

This study investigated the effects of relative humidity and air temperature on the growth of orchid plants in the area of Wichienmatu School , Mueang Trang District, Trang Province. The objectives of this research were 1. to compare relative humidity in shaded and open-air orchid growing areas and its effects on orchid growth; 2. to compare air temperature in shaded and open-air orchid growing areas and it's affecting orchid growth; and 3.to study the relationship between relative humidity and air temperature in shaded and open-air areas that influence orchid growth in the area of Wichienmatu School, Mueang Trang District, Trang Province. The results revealed that relative humidity and air temperature significantly affected orchid growth. Shaded areas provided the most suitable conditions for orchid growth, with lower average air temperature and higher average relative humidity. As a result, orchids grown in shaded areas exhibited higher growth rates than those grown in open-air areas. The relationship between relative humidity and air temperature was found to be inverse, particularly in open-air areas where higher air temperatures resulted in lower relative humidity.

Keywords: Open-air area, shaded area, relative humidity and temperature

Introduction

Orchids are economically significant ornamental plants known for their beauty and They are widely cultivated and Thailand. Thailand is considered one of the most suitable regions in the world for orchid cultivation due to it's hot and humid climate and year-round Macsunlight which allow orchids to thrive under conditions. Orchid growth and flowering depend on several environmental factors such as light, temperature, water, and relative humidity. Among these

factors, relative humidity directly affects water absorption, respiration, and the development of roots, leaves, and flowers. As epiphytic plants , orchids possess root systems that rely on atmospheric moisture to absorb water and minerals

Research Questions

1. Do differences in relative humidity between open-air and shaded areas affect orchid growth? How?
2. Do differences in air temperature between open-air and shaded areas affect orchid growth? How?
3. Does the relationship between relative humidity and air temperature in open-air and shaded areas affect orchid growth? How?

Research Hypotheses

1. Differences in relative humidity between open-air and shaded areas affect orchid growth.

2. Differences in air temperature between open-air and shaded areas affect orchid growth.

3. The relationship between relative humidity and air temperature in open-air and shaded areas affects orchid growth

Materials and Research Methods

Study Area

Open-air and shaded areas within Wichienmatu School, Trang Province.

Project Variables and Hypotheses

Hypothesis 1: Different relative humidity levels affect the growth of orchid stems and roots.

Independent Variable: Relative humidity in the orchid cultivation areas.

Dependent Variable: Growth and flowering of the orchid plants.

Controlled Variables: Size of the study area, survey dates, and measurement. instruments used.

Hypothesis 2: Ambient temperature affects the growth of orchid plants.

Independent Variable: Ambient temperature in both open-sun and shaded areas.

Dependent Variable: Growth and flowering of the orchid plants.

Controlled Variables: Size of the study area, survey dates, and measurement instruments used.

Hypothesis 3: The relationship between relative humidity and ambient temperature.

Independent Variable: Optimal temperature and relative humidity levels for cultivation.

Dependent Variable: Growth and flowering of the orchid plants.

Controlled Variables: Size of the study area, survey dates, and measurement instruments used.

Materials

1.) Thermometer

2.) Measuring tape

Part 1: To study the effect of relative humidity on orchid growth at Wichienmatu School, Trang Province.

1.1 Establish two experimental sites for orchid cultivation, both located within the community's orchid conservation zone. Site 1 is designated for orchids grown in an open-sun area, while Site 2 is designated for orchids grown in a shaded area.

1.2 Measure ambient temperature using an air thermometer positioned at a height of 2 meters. Additionally, record soil temperature readings. Data will be collected for a total of 15 observations.

1.3 Measure air humidity at all designated points using a thermometer (hygrometer) positioned at a height of 100 centimeters. Data will be collected for a total of 15 observations.

Part 2: Measurement of Orchid Growth

2.1 Orchid growth was observed by measuring plant height using a measuring tape once a week and recording the results.

Research findings

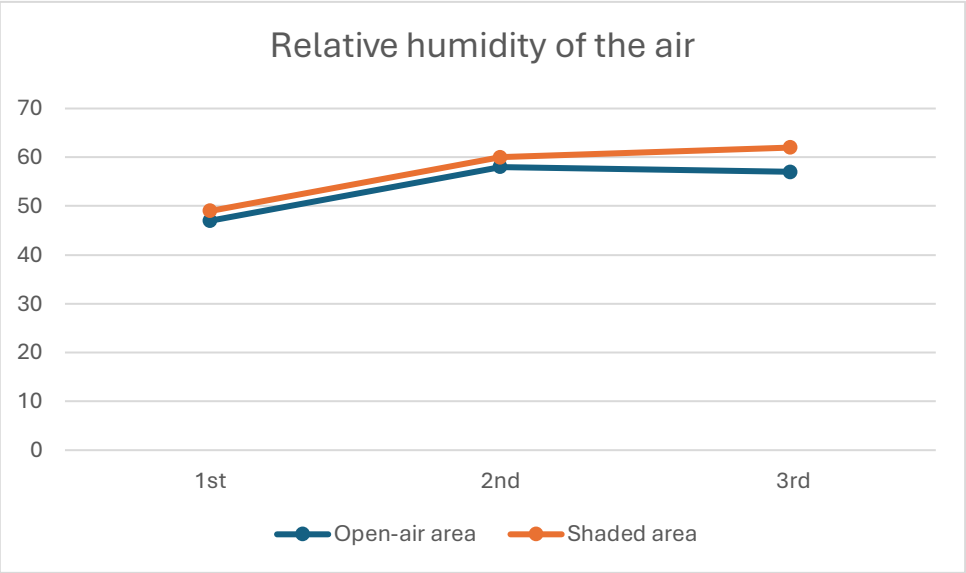
The study on temperature and relative humidity affecting the in the area of Wichienmatu School ,Trang Province , produced the following findings.

Geographical Coordinates

Table 1 Geographical Coordinates of the Area at Wichienmatu School

Area	Geographical Coordinates	
	Latitude(N)	Longitude(E)
Open-air area	7.50441	99.62938
Shaded area	7.50412	99.62879

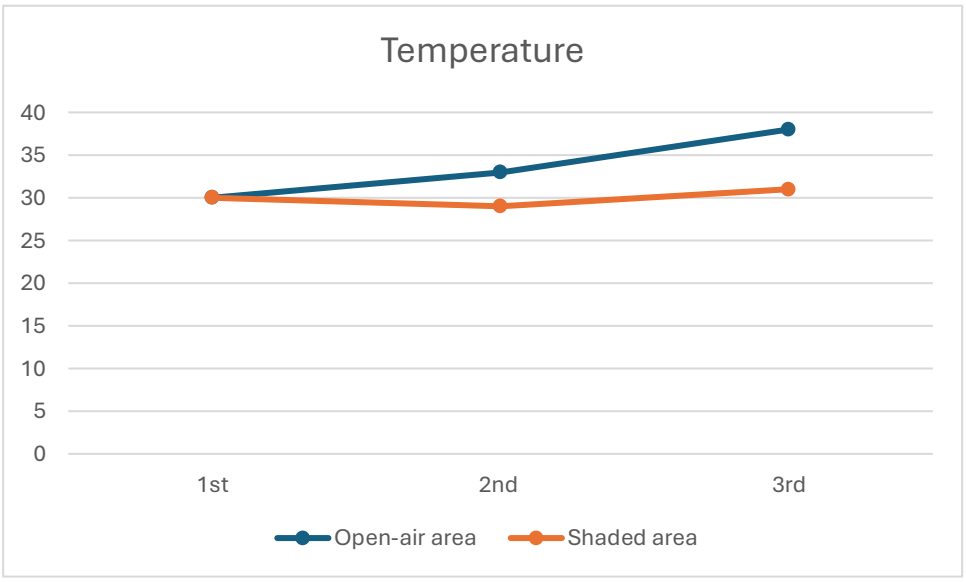
Part 1 : Study of Relative Humidity Affecting the Growth of Orchid in the Area of Wichienmatu School



Part 1: Relative Humidity

The graph of relative humidity showed that although both areas had similar humidity values; however, the shaded area had higher relative humidity than the open-air area. During the third measurement, relative humidity in the open-air area decreased compared to the second measurement, while it increased in the shaded area.

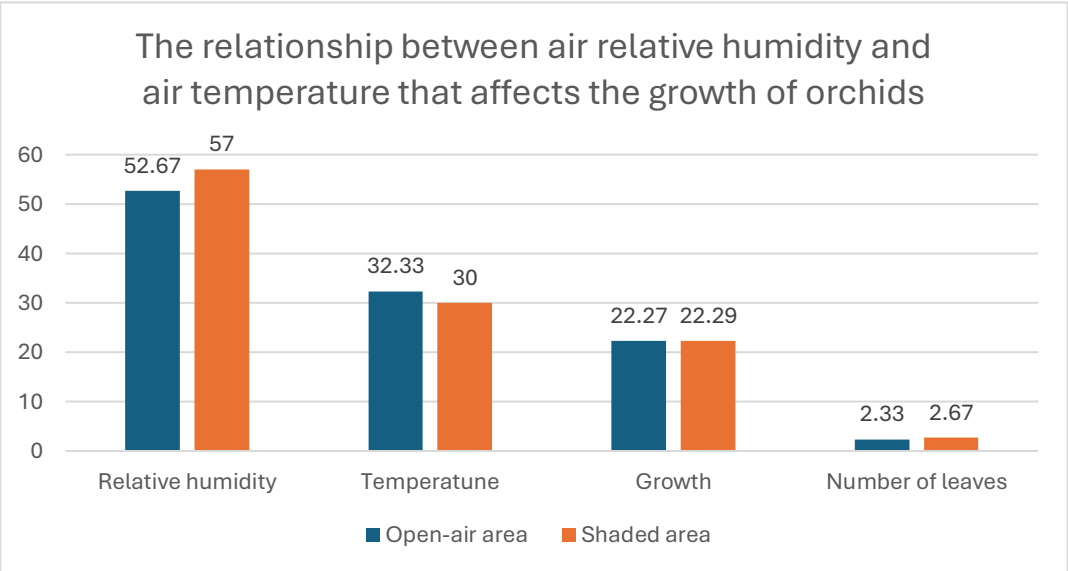
Part 2 : A study of air temperature affecting the growth of orchid in the area of Wichienmatu School , Trang Province



Part 2: Air Temperature

The air temperature graph indicated differences between the two areas. The open-air area had higher air temperatures than the shaded area. During the second and third measurements, air temperature in the open-air area increased, while the shaded area showed a decrease during the second measurement and an increase during the third measurement.

Part 3 : A study of the relationship between relative humidity and air temperature affecting orchid growth



Part 3: Relationship Between Relative Humidity and Air Temperature

The bar chart illustrated an inverse relationship between relative humidity and air temperature. The open-air area exhibited higher temperatures and lower relative humidity, while the shaded area had lower temperatures and higher relative humidity. Observations of orchid growth showed similar increases in plant height in both areas; however, orchids in the shaded area produced more new leaves on average, indicating that higher relative humidity and suitable temperatures promoted better leaf development.

Conclusion and Discussion

The study concluded that relative humidity and air temperature significantly affected orchid growth. Shaded areas provided the most suitable conditions for orchid growth, with lower average air temperature and higher average relative humidity. Consequently, orchids grown in shaded areas demonstrated higher growth rates than those grown in open-air areas. Furthermore, the relationship between relative humidity and air temperature was inverse, particularly in open-air areas where higher air temperatures resulted in lower relative humidity. Hot and dry conditions were not conducive to orchid growth.

Recommendations

1. Expand the study area.
2. Study plants with characteristics similar to orchids in the study area.
3. Investigate aerial root growth or measure light intensity.

Acknowledgements

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